CLAIMS

1. A method of measuring a chemical constituent of an opaque slurry comprising opaque slurry particles and said chemical constituent, said method comprising:

flowing at least a portion of said slurry into a separator;

separating said chemical constituent from said opaque slurry particles;

flowing said separated chemical constituent into an optical detector; and

measuring said chemical constituent while said chemical constituent is flowing through said detector.

2. A method as in claim 1 wherein said separating comprises filtering said slurry with a porous filter element.

3. A method as in claim 2 wherein said filtering comprises filtering with a filter selected from the group consisting of a filter membrane and a ceramic filter element.

4. A method as in claim 3 and further comprising reverse flushing said separated chemical constituent through said porous filter element.

5. A method as in claim 4 wherein said reverse flushing is performed for five seconds or less for each minute of said flowing.

6. A method as in claim 4 wherein said reverse flushing is performed for one second or less for each minute of said flowing.

7. A method as in claim 4 wherein said reverse flushing is performed for one second or less for each five minutes of said flowing.

8. A method as in claim 1 and further comprising flowing said chemical constituent from said optical detector into a reservoir.

9. A method as in claim 8 and further comprising emptying said reservoir.

10. A method as in claim 9 wherein said emptying is performed less than once for each ten minutes of said flowing.

11. A method as in claim 9 wherein said emptying is performed less than once for each twenty minutes of said flowing.

12. A method as in claim 1 and further comprising recombining said separated chemical constituent and said opaque slurry particles.

13. A method as in claim 12 wherein said recombining comprises reverse flowing said chemical constituent in a reverse direction from the direction of said flowing.

14. A method as in claim 12 wherein said recombining comprises flowing said separated slurry particles and chemical constituent into a tank where they are recombined.

15. A method as in claim 1 wherein said flowing said separated chemical constituent comprises flowing in a downward direction after said separating.

16. A method as in claim 1 where said flowing into an optical detector comprises flowing said chemical constituent in an upward direction through said optical detector.

17. A method as in claim 1 wherein said measuring comprises measuring with a spectrometer.

18. A method as in claim 1 wherein said flowing is performed essentially continuously.

19. A method as in claim 1 and further including connecting said separator between the dispense engine and the day tank of a slurry distribution system.

20. A method as in claim 1 wherein said flowing, separating, flowing and measuring are accomplished without ever contacting said slurry to a fluid valve.

21. A method of measuring a chemical constituent of an opaque slurry comprising opaque slurry particles and said chemical constituent, said method comprising:

separating at least a portion of said chemical constituent from said opaque slurry particles;

placing said separated chemical constituent into an optical detector;

measuring said chemical constituent; and

recombining said separated chemical constituent and said opaque slurry particles.

22. A method of measuring a chemical constituent of an opaque slurry comprising opaque and abrasive slurry particles and said chemical constituent, said method comprising flowing said chemical constituent into an optical detector and

measuring said chemical constituent without ever contacting a fluid valve with said abrasive slurry particles.

23. A system for measuring a chemical constituent of an opaque slurry comprising opaque slurry particles and said chemical constituent, said method comprising:

a separator for separating said slurry particles from said chemical constituent, and said separator comprising a slurry region and a chemical constituent region;

an optical detector; and

a flow control system for controlling flow of said chemical constituent from said chemical constituent region to said optical detector.

24. A system as in claim 23 wherein said separator comprises a filter.

25. A system as in claim 24 wherein said separator comprises a cross-flow filter.

26. A system as in claim 24 wherein said separator comprises a filter selected from the group consisting of a ceramic filter and an inert polymer membrane filter.

27. A system as in claim 26 wherein said filter includes a permeate port located at the top of said filter.

28. A system as in claim 27 wherein said optical detector includes a flow cell and said flow control system includes a chemical constituent conduit connected between said permeate port and the bottom of said flow cell.

29. A system as in claim 23 wherein said flow control system includes a pressure bleed port.

30. A system as in claim 29 wherein said flow control system further includes a valve located between said optical detector and said pressure bleed port.

31. A system as in claim 23 wherein said flow control system includes a pressure source and a first valve.

32. A system as in claim 31 wherein said first valve is located between said pressure source and said optical detector.

33. A system as in claim 32 and further including a second valve located between said pressure source and said separator.

34. A system as in claim 32 wherein said first valve is located between said pressure source and said separator.

35. A system as in claim 23 wherein said flow control system includes a reservoir connected to said optical detector.

36. A system as in claim 35 and further including: a chemical constituent return conduit; a first valve connected between said separator and said optical detector; a second valve connected between said optical detector and said reservoir; and a third valve connected between said reservoir and said chemical constituent return conduit.

37. A system as in claim 36 and further including a fourth valve located between said reservoir and said separator.

38. A system as in claim 35 and further including a liquid level sensor connected to said reservoir.

39. A system as in claim 23 wherein said optical detector comprises a spectrometer.

40. A system as in claim 23 wherein said flow control system further controls flow of said separated slurry particles from said slurry region, and said control system includes a conduit adapted to connect said separator to a day tank of a slurry distribution system.

41. A system for measuring a chemical constituent of an opaque slurry comprising opaque slurry particles and said chemical constituent, said method comprising:

a filter including a filter input port, a slurry retentate region, and a chemical constituent permeate region;

an optical detector; and

a flow control system comprising: a conduit connecting said chemical constituent permeate region and said optical detector, and a pressure bleed port connected to said optical detector.

42. A system as in claim 41 wherein said optical detector comprises a spectrometer.

43. A system as in claim 42 wherein said filter is selected from the group

consisting of a ceramic filter and an inert polymer membrane filter.